

REMARKS

Claims 1-5, 7-8, 10-14 and 16-20 are all of the claims presently being examined in the application. Claims 1-3, 5, 10-12 and 14 have been amended to more particularly define the invention. New claims 18-20 are presented to more completely claim the invention. Claims 6, 9 and 15 have been withdrawn pursuant to the election requirement.

It is noted that the claim amendments are made only to assure grammatical and idiomatic English and improved form under United States practice, and are not made to distinguish the invention over the prior art or narrow the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Applicant gratefully acknowledges the Examiner's indication that claims 4 and 13 would be allowable. However, Applicant respectfully submits that claims 1 and 10, as amended, are allowable in light of the following arguments.

Claims 1, 5, 7, 10, 14 and 16 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Miyasyo (U.S. Patent No. 6,201,689) in view of Admitted Prior Art. Claims 2-3 and 11-12 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Miyasyo in view of the Admitted Prior Art and further in view of Hanato et al. (U.S. Patent No. 5,414,220). Claims 8 and 17 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Miyasyo in view of Admitted Prior Art and further in view of Oughton, Jr., et al. (U.S. Patent No. 4,251,683).

These rejections are respectfully traversed in the following discussion.

I THE CLAIMED INVENTION

The claimed invention is directed to a display apparatus and a connecting cable of a display apparatus.

In one exemplary aspect, as recited in claim 1, a display apparatus including a first connecting terminal provided in a first end portion of a connecting cable and electrically connected to an electrode terminal of a display panel through a conductive adhesive, and a second connecting terminal provided in a second end portion of the connecting cable and electrically connected to a terminal of a drive circuit board for the display panel through the conductive adhesive, the display apparatus comprising, a third connecting terminal provided in the second end portion of the connecting cable for establishing electric connection to a connector provided on a replacement drive circuit board; a third connecting terminal provided in the second end portion of the connecting cable for establishing electric connection to a connector provided on a replacement drive circuit board, wherein the third connecting terminal is insertable into the connector on the replacement drive circuit board.

Another aspect of the invention, as recited in claim 10, is directed toward a connecting cable of a display apparatus including a first connecting terminal provided in a first end portion of the connecting cable and electrically connected to an electrode terminal of a display panel through a conductive adhesive, and a second connecting terminal provided in a second end portion of the connecting cable and electrically connected to a terminal of a drive circuit board for the display panel through the conductive adhesive, for the purpose of establishing electric connection between the display panel and the drive circuit board, the connecting cable of the display apparatus comprising, a third connecting terminal provided in the second end portion for establishing electric connection to a connector provided in a

replacement drive circuit board, wherein the third connecting terminal is insertable into the connector on the replacement drive circuit board.

In yet another aspect of the invention, as recited in new claim 18, a connecting cable for a display apparatus comprising a first connecting terminal provided in a first end portion of the connecting cable electrically connected to a display panel; a second connecting terminal provided in a second end portion of the connecting cable electrically connected through a conductive adhesive to a terminal of a drive circuit board for the display panel, and a third connecting terminal provided in the second end portion for establishing an electric connection to a connector provided in a replacement drive circuit board, wherein said third connecting terminal is insertable into the connector on the replacement drive circuit board.

The conventional structure of an electric connection between a plasma display panel (PDP) and a driver board for driving the PDP in a display apparatus having the PDP includes a flexible cable extending between and attached to respective electrode terminals located on the PDP and driver board. To attach the flexible cable to the electrode terminals, the electrode terminals are coated with an anisotropic conductive adhesive of a thermosetting property. The respective ends of the flexible cable are then overlapped in a predetermined position onto their respective electrode terminals and thermo-compressively bonded thereto forming the electric connection. (Application at Figure 2 and page 3, lines 13-25)

While the conventional structure may reduce the production costs of the display apparatus, it has several problems. Namely, the thermo-compression bonding technique using an anisotropic conductive adhesive employed to connect the flexible cable to the PDP and driver board makes replacing a faulty or defective driver board very difficult at the location of the display apparatus, such as a household. In such events, the display apparatus

must be removed to a workshop for replacement work using specially designed equipment, often resulting in enormous effort and increased repair costs. (Application at page 4, lines 14-27 and page 5, lines 1-2)

The claimed invention, on the other hand, provides a third connecting terminal provided in the second end portion for establishing electric connection to a connector provided in a replacement drive circuit board, wherein the third connecting terminal is insertable into the connector on the replacement drive circuit board. This feature facilitates the replacement of a faulty drive circuit board with a replacement board. Such easy replacement obviates the effort, time, and costs required to move the failed display apparatus to a workshop for repairs, as would be the case using the conventional techniques. (Application at page 7, lines 7-25)

II. THE CLAIM OBJECTIONS

The Examiner has objected to claims 1-5, 7-8, 10-14, and 16-17 due to informalities. Claims 1, 5, 10 and 14 have been amended to overcome the objections. Specifically, in claim 1, "a conductive adhesive" has been changed to -- the conductive adhesive -- , as suggested by the Examiner. Additionally, the lack of antecedent basis noted by the Examiner in claims 5, 10 and 14 has been corrected.

In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the objections.

III. THE PRIOR ART REFERENCES

A. The Miyasyo Reference & The Alleged APA

The Examiner alleges that the Miyasyo would have been combined with alleged Admitted Prior Art (APA) to form the invention of claims 1, 5, 7, 10, 14 and 16. However, Applicant submits that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

Miyasyo discloses a flexible printed substrate connected to an LCD at one end thereof and at the other end, a thermocompression bonding terminal and a repair terminal (thermocompression bonding terminal for use in repairing) are arranged side by side and connected by means of thermocompression bonding with an anisotropic conductive bond interposed between them. (Miyasyo at Abstract)

The alleged APA discloses a conventional structure of an electric connection between a PDP and a driver board for driving the PDP in a display apparatus having the PDP including a flexible cable extending between and attached to respective electrode terminals located on the PDP and driver board. To attach the flexible cable to the electrode terminals, the electrode terminals are coated with an anisotropic conductive adhesive of a thermosetting property. The respective ends of the flexible cable are then overlapped in a predetermined position onto their respective electrode terminals and thermo-compressively bonded thereto forming the electric connection. (See Application at Figures 1 and 2; page 2, lines 9-27; page 3, lines 1-27; and page 3, lines 1-4).

Applicant respectfully submits that these references would not have been combined as alleged by the Examiner. Indeed, no person of ordinary skill in the art would have considered combining these disparate references, absent impermissible hindsight.

In fact, Applicant submits that the Examiner can point to no motivation or suggestion in the references to urge the combination as alleged by the Examiner. Indeed, contrary to the Examiner's allegations, neither of these references teach or suggest their combination.

Therefore, Applicant respectfully submits that one of ordinary skill in the art would not have been so motivated to combine the references as alleged by the Examiner. Therefore, the Examiner has failed to make a prima facie case of obviousness.

Moreover, neither Miyasyo, nor the APA, nor any combination thereof, teaches or suggests "*a third connecting terminal provided in the second end portion of the connecting cable for establishing electric connection to a connector provided on a replacement drive circuit board; wherein said third connecting terminal is insertable into the connector on the replacement drive circuit board*," as recited in claims 1, 10 and 18. (emphasis added)

As noted above, unlike conventional methods of electrically connecting a PDP with an drive-circuit board in which the flexible cable is thermo-compressively bonded to respective terminals, thus complicating the replacement of faulty boards, the claimed method includes a third connecting terminal provided in the second end portion of the connecting cable for establishing electric connection to a connector provided on a replacement drive circuit board, wherein the third connecting terminal is insertable into the connector on the replacement drive circuit board. These features help to facilitate the replacement of faulty boards by avoiding the need for thermo-compressively bonding the cable to a replacement board, helping to reduce the costs and effort required to repair a display apparatus.

Clearly, these features are not taught or suggested by the cited references. Indeed, the Examiner concedes on page 3 of the Office Action that Miyasyo and the alleged APA do not disclose that the third connecting terminal is coupled to the connector on the replacement

drive circuit board by means of insertion.

In fact, Miyasyo specifically discloses a repair terminal which comprises a thermo-compression bonding terminal for use in repairing. (Miyasyo at column 3, lines 55-60) Thus, in Miyasyo, when repairs are required, the repair terminal is thermo-compressively bonded using an anisotropic conductive bond to the LCD or main substrate as required. (Miyasyo at column 4, lines 35-39) As such, Miyasyo employs the very connecting technique (thermo-compressive bonding) for repairs having the problems cited above, which the present invention is intended to address.

The Examiner asserts that the alleged APA makes up for the deficiencies of Miyasyo. However, as noted above, the alleged APA merely discloses the conventional structure of an electric connection between a PDP and a driver board wherein the flexible cable is attached to respective electrode terminals by employing thermo-compressive bonding using an anisotropic conductive adhesive. (See Application at Figures 1 and 2; page 2, lines 9-27; page 3, lines 1-27; and page 3, lines 1-4). Indeed, nowhere does the alleged APA teach or suggest a third connecting terminal provided in the second end portion of the connecting cable for establishing electric connection to a connector provided on a replacement drive circuit board, wherein the third connecting terminal is insertable into the connector on the replacement drive circuit board, thereby facilitating the replacement of faulty drive circuit boards. Further, nowhere does the alleged APA even recognize the problems with replacing faulty boards connected by thermo-compressive bonding, which is a problem which the claimed invention is intended to address. As such, the alleged APA clearly does not make up for the deficiencies of Miyasyo.

In light of the above, Applicant submits that these references would not have been

combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

B. The Hanato et al. Reference

The Examiner alleges that the Miyasyo/APA combination would have been further combined with Hanato et al. form the invention of claims 2-3 and 11-12. However, Applicant submits that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

Hanato et al. discloses a flexible wiring cable being provided on its forward end with a connecting portion to be connected with a connector, which comprises a base film, a wiring conductor provided on the base film, a dielectric member electrically connected with the wiring conductor in the connecting portion of the base film, and a ground electrode electrically connected with the dielectric member for forming a capacitor with the wiring conductor. (Hanato et al. at Abstract)

Applicant respectfully submits that these references would not have been combined as alleged by the Examiner. Indeed, these references are completely unrelated, and no person of ordinary skill in the art would have considered combining these disparate references, absent impermissible hindsight.

In fact, Applicant submits that the Examiner can point to no motivation or suggestion in the references to urge the combination as alleged by the Examiner. Indeed, contrary to the Examiner's allegations, neither of these references teach or suggest their combination.

Therefore, Applicant respectfully submits that one of ordinary skill in the art would not have been so motivated to combine the references as alleged by the Examiner. Therefore,

the Examiner has failed to make a prima facie case of obviousness.

Moreover, neither Miyasyo, nor the APA, nor Hanato et al., nor any combination thereof, teaches or suggests “*a third connecting terminal provided in the second end portion of the connecting cable for establishing electric connection to a connector provided on a replacement drive circuit board; wherein said third connecting terminal is insertable into the connector on the replacement drive circuit board*,” as recited in the claimed invention.

(emphasis added) As noted above, these features facilitate the replacement of faulty boards by avoiding the need for thermo-compressively bonding the flexible cable to a replacement board, helping to reduce the costs and effort required to repair a display apparatus.

Clearly, these features are not taught or suggested by the cited references. Indeed, the Examiner concedes on page 3 of the Office Action that Miyasyo and the alleged APA do not disclose that the third connecting terminal is insertable into the connector on the replacement drive circuit board. Rather, the Examiner attempts to rely on Hanato et al. to make up for the deficiencies of Miyasyo and the alleged APA.

However, Hanato et al. fails to teach or suggest a third connecting terminal provided in the second end portion of the connecting cable for establishing electric connection to a connector provided on a replacement drive circuit board, wherein the third connecting terminal is insertable into the connector on the replacement drive circuit board, as recited in the claimed invention.

Further, even assuming arguendo that Hanato et al. may teach a reinforcing plate to enable connection by insertion into a socket, as asserted by the Examiner, nowhere does Hanato et al. teach or suggest a third connecting terminal which is insertable into the connector on the replacement drive circuit board for facilitating replacement of faulty circuit

drive boards. Indeed, nowhere does Hanato et al. disclose a third connecting terminal of any type or even recognize the problems with replacing faulty boards connected by thermo-compressive bonding, which is a problem that the claimed invention is intended to address. Therefore, Hanato et al. clearly does not make up for the deficiencies of Miyasyo and the alleged APA.

In light of the above, Applicant submits that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

C. The Oughton, Jr. et al. Reference

The Examiner alleges that the Miyasyo/APA combination would have been further combined with Oughton, Jr. et al. form the invention of claims 8 and 17. However, Applicant submits that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

Oughton, Jr. et al. discloses a connecting tail for a switching device including a substrate having a plurality of spaced parallel silver conductors formed thereon and a plurality of parallel notches, one between adjacent silver conductor to prevent migration of silver therebetween, wherein at least a portion of the conductors are covered by an adhesive, with the notches extending into the adhesive. (Oughton, Jr. et al. at Abstract)

Applicant respectfully submits that these references would not have been combined as alleged by the Examiner. Indeed, no person of ordinary skill in the art would have considered combining these disparate references, absent impermissible hindsight.

In fact, Applicant submits that the Examiner can point to no motivation or suggestion

in the references to urge the combination as alleged by the Examiner. Indeed, contrary to the Examiner's allegations, neither of these references teach or suggest their combination.

Therefore, Applicant respectfully submits that one of ordinary skill in the art would not have been so motivated to combine the references as alleged by the Examiner. Therefore, the Examiner has failed to make a prima facie case of obviousness.

Moreover, neither Miyasyo, nor the APA, nor Oughton, Jr. et al., nor any combination thereof, teaches or suggests "*a third connecting terminal provided in the second end portion of the connecting cable for establishing electric connection to a connector provided on a replacement drive circuit board; wherein said third connecting terminal is insertable into the connector on the replacement drive circuit board,*" as recited in the claimed invention.

(Emphasis added) As noted above, these features facilitate the replacement of faulty boards by avoiding the need for thermo-compressively bonding the cable to a replacement board, helping to reduce the costs and effort required to repair a display apparatus.

Clearly, these features are not taught or suggested by the cited references. Indeed, the Examiner concedes on page 3 of the Office Action that Miyasyo and the alleged APA do not disclose that the third connecting terminal is insertable into the connector on the replacement drive circuit board. Rather, the Examiner attempts to rely on Oughton, Jr. et al. to make up for the deficiencies of Miyasyo and the alleged APA.

However, Oughton, Jr. et al. fails to teach or suggest a third connecting terminal provided in the second end portion of the connecting cable for establishing electric connection to a connector provided on a replacement drive circuit board, wherein the third connecting terminal is insertable into the connector on the replacement drive circuit board, as recited in the claimed invention.

Further, even assuming arguendo that Oughton, Jr. et al. may teach terminals separated by slits, as asserted by the Examiner, nowhere does Oughton, Jr. et al. teach or suggest a third connecting terminal which is insertable into the connector on the replacement drive circuit board for facilitating replacement of faulty circuit drive boards. Indeed, nowhere does Oughton, Jr. et al. disclose a third connecting terminal of any type or even recognize the problems with replacing faulty boards connected by thermo-compressive bonding, which is a problem that the claimed invention is intended to address. Therefore, Oughton, Jr. et al. clearly does not make up for the deficiencies of Miyasyo and the alleged APA.

In light of the above, Applicant submits that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

IV. FORMAL MATTERS AND CONCLUSION

Applicant notes that the Examiner did not indicate the Hanato et al. reference on the Notice of References Cited attached to the present Office Action. Applicant respectfully requests the Examiner to formally indicate that the reference was cited.

In view of the foregoing, Applicant submits that claims 1-5, 7-8, 10-14, and 16-20, all the claims presently being examined in the application, are patentably distinct over the prior art of record and are allowable, and that the application is in condition for allowance. Such action would be appreciated.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned attorney at the local telephone number

Serial No. 10/718,695
Docket No. 03-35 PUS
EBI.015

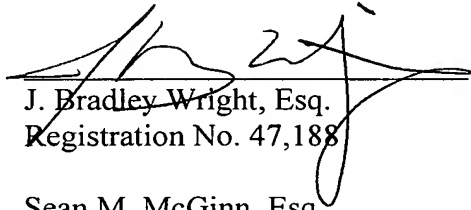
19

listed below to discuss any other changes deemed necessary for allowance in a telephonic or personal interview.

To the extent necessary, Applicant petitions for an extension of time under 37 CFR §1.136. The Commissioner is authorized to charge any deficiency in fees, including extension of time fees, or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 3/15/05


J. Bradley Wright, Esq.
Registration No. 47,188

Sean M. McGinn, Esq.
Registration No. 34,386

McGinn & Gibb, PLLC
8321 Old Courthouse Road, Suite 200
Vienna, VA 22182-3817
(703) 761-4100
Customer No. 21254